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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/537,458

06/03/2005

Eliahu Kritchman

P-5526-US

4687

49443 7590 09/09/2008
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EXAMINER

WIECZOREK, MICHAEL P

ART UNIT

PAPER NUMBER

1792

MAIL DATE

DELIVERY MODE

09/09/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/537,458	Applicant(s) KRITCHMAN ET AL.	
	Examiner Michael Wieczorek	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 197-219 is/are pending in the application.
- 4a) Of the above claim(s) 209-219 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 197-208 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>6/3/2005, 2/9/2006, 5/20/2008</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 197-208, drawn to a method for printing a three-dimensional object.

Group II, claim(s) 209-219, drawn to a system for printing a three-dimensional object.

2. Lack of unity of invention may be may only become apparent “a posteriori,” that is, after taking the prior art into consideration, in the case of independent claims to A + X and A + Y, unity of invention(i.e. species) is present a posteriori as A is common to both claims.

The inventions listed as Groups I-II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons: the special technical feature which is referred to Annex B of Appendix A1 of the MPEP (Administrative Instructions under the PCT, “Unity of Invention”). The express “special technical features” is defined as meaning those technical features that define a contribution which each of the inventions, considered as a whole, makes over the prior art.” (Rule 13.2). Unity exists only when there is a technical relationship among the claimed inventions involving one or more of the same or corresponding claimed special technical features. In this case, the technical feature shared by each invention is the printing

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system which comprises a printing head a printing tray and a controller for controlling the temperature of the deposited layers.

The question of unity of invention has been reconsidered retroactively by the examiner in view of the search performed; a review of Jan et al (U.S. Patent # 6,165,406), makes clear that the inventions of the groups I-II lack the same or corresponding special technical feature because the cited reference(s) appear to demonstrate that the claimed technical feature does not define a contribution which each of the inventions, considered as a whole, makes over the prior art. Jang et al teaches a printing apparatus comprising a printing head in the form of a droplet deposition device, a printing tray in the form of an object-supporting platform (Column 7 Lines 1-9, 13-15), and a controller in the form of a heating means used to control the temperature of the deposited material (Column 12 Lines 55-63). Accordingly, the prior art of the record supports restriction of the claimed subject matter in to the groups as mentioned immediately above.

3. During a telephone conversation with Guy Yonay on August 26, 2008 a provisional election was made to prosecute the invention of group I, claims 197-208. Affirmation of this election must be made by applicant in replying to this Office action. Claims 209-219 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

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5. Claims 197-208 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

6. The term "substantially" in claims 197 and 201 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. The claims disclose the requirement that the temperature of the deposited material is "substantially the glass transition temperature of said material". It is not clear from reading the specification how much the temperature of the deposited material can deviate from the glass transition temperatures and still be "substantially" the same as the glass transition temperature.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 197-204 are rejected under 35 U.S.C. 102(b) as being taught by Jang et al.

Jang et al teaches a process and apparatus for making a three-dimensional object by depositing onto a printing tray in the form of a support platform droplets of multiple liquid compositions containing a solidifiable baseline body-building material and different colorants.

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The taught process involves depositing the material droplets to form multiple layers onto the support platform. (Abstract)

Jang et al further teaches that the taught deposition device comprises heating and cooling means provided around the support platform in order to control the solidification behavior, which is inherently controlled by the temperature, of the material on the platform (Column 12 Lines 58-63). Furthermore, Jang et al teaches that when a non-crystalline material such as glass and amorphous thermoplastic polymers are used the material temperature and the support platform is controlled so that the temperature is lower than the glass transition temperature of the material and the temperature of the material being deposited is slightly higher than the glass transition temperature (Column 15 Lines 44-53). Thus the temperature of the material is controlled to be substantially the glass transition temperature.

For the reasons discussed above the steps of claim 197 of the present case have been taught by Jang et al and are thus rejected.

As for claim 198, Jang et al teaches that when a non-crystalline material is used for deposition a portion of the previous layer facing the nozzle of the deposition device must have been solidified before the new material is brought in contact with this portion of the previous layer (Column 15 Lines 50-53) and that the support platform which receives the deposited material comprises a heating and cooling means in order to control the solidification behavior of the material (Column 12 Lines 59-63). Thus based on this information Jang et al teaches controlling the temperature of the layers during the printing process.

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As for claim 199, as was discussed in the claim 197 rejection, Jang et al teaches a method of operating a deposition device for supplying droplets of multiple liquid compositions (Abstract). Thus Jang et al teaches that more than one material is deposited.

As for claim 200, Jang et al teaches that the deposition device of the apparatus has a temperature-controlled means to ensure that the material remains in a flowable state while residing in the reservoir, pipe, or channel prior to being dispensed (Column 12 Lines 55-58). Furthermore, as previously discussed above in the claim 197 rejection, Jang et al teaches that when a non-crystalline material is used for deposition the temperature is maintained at a temperature above the glass transition temperature (Column 15 Lines 44-48). Based on this information Jang et al teaches heating the material before deposition.

As for claim 201, as was discussed in the claim 197 rejection, Jang et al teaches heating the support platform or printing tray to control the solidification behavior of the deposited material (Column 12 Lines 58-63) and that when the material is a non-crystalline material the temperature of the material and support platform is controlled to be substantially the glass transition temperature (Column 15 Lines 44-53).

As for the claim 202, as was discussed in the claim 197 rejection, Jang et al teaches controlling the temperature of the material to be above the glass transition temperature before being discharged (Column 15 Lines 44-48). Thus since the temperature of the material is above the glass transition temperature it would be inherent that the temperature of the upper layers formed by this material would be at a temperature above the glass transition temperature until these layers were cooled to a temperature at or below the glass transition temperature.

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As for claim 203, Jang et al teaches controlling the temperature of the support platform is lower than the glass transition temperature and that the previous material layers deposited onto the platform are solidified (Column 15 Lines 48-53). Thus Jang et al teaches controlling the temperature of the lower layers to be below the glass transition temperature of the material.

As for claim 204, Jang et al teaches that the solidification behavior of the deposited material is controlled, which is inherently controlled by the temperature of the material, by a heating element or a cooling element in the form of cooling coils, thus Jang et al teaches (Column 12 Lines 55-63).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 205-206 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jang et al as applied to claim 204 above, and further in view of Leyden et al (U.S. Patent # 6,193,923).

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As was disused in the claim 204 rejection, Jang et al teaches controlling the temperature of the deposited material layers by controlling the temperature of the layers using heating means and a cooling means (Column 12 Lines 55-63). Though Jang et al teaches using a cooling means to control the temperature it does not explicitly teach using an air sucking unit as a cooling means as is required by claim 205 or using an air blowing unit as a cooling means as is required by claim 206.

Leyden et al teaches techniques for forming three dimensional objects (Column 1 lines 14-22) where the objects are produced by an apparatus similar to the one taught by Jang et al in that the taught apparatus of Leyden et al comprises a print head or dispensing head which dispensing hot melt materials like thermal plastics or wax-like materials onto a dispensing platform to form a three-dimensional object (Column 11 Lines 44-56 and Column 12 Lines 40-44).

The apparatus taught by Leyden et al further comprises a cooling system and one taught embodiment of this cooling system are blowing and sucking devices in the form of blowing and sucking ducts to used cool the material, thus controlling the temperatures, of the dispensed material using a cooling gas such as air (Column 12 Lines 15-39). Thus Leyden et al teaches using an air sucking unit and an air blowing unit as cooling elements.

At the time the present invention was made it would have been obvious to one of ordinary skill in the art to use as a cooling element to control the temperature of deposited material layers by using an air sucking unit and an air blowing unit. The teachings of Jang et al suggest that any suitable cooling means would suffice in the invention taught by Jang et al as long as the cooling means allowed for the controlling of the solidification behavior of the

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material deposited on the platform. Leyden et al teaches that a type of cooling element that can be used in an apparatus for forming a three-dimensional object are air sucking and air blowing units in the form of air sucking and air blowing devices. Thus one of ordinary skill in the art could use as the cooling means in the invention taught by Jang et al the air sucking unit and air blowing unit of Leyden et al and have a reasonable expectation of success.

12. Claims 207-208 rejected under 35 U.S.C. 103(a) as being unpatentable over Jang et al as applied to claim 197 above, and further in view of Leyden et al.

The teachings of Jang et al as they apply to claim 197 have been discussed previously (See 102 rejection).

Jang et al teaches controlling the temperature of the layers deposited by using a heating element and a cooling element (Column 12 Lines 55-63) but it does not teach that these two elements are operated according to readings received from a temperature sensor.

As was discussed in the 205 and 206 rejection, Leyden et al teaches techniques for forming three dimensional objects where the objects are produced by an apparatus similar to the one taught by Jang et al. Leyden et al further teaches that the cooling systems of the taught apparatus may be computer controlled in combination with temperature sensors in the form of temperature sensing devices to maintain the previously dispensed material within a desired temperature range (Column 12 Lines 1-5). Though Leyden et al does not explicitly teach using the temperature sensor in conjunction with a heating element it would be obvious that it could be by one of ordinary skill in the art since using a temperature sensor to operate a cooling system as taught by Leyden et al is an obvious variant of using a temperature sensor to operate a heating

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system or element since both process relate to controlling the temperature of a material based on it's measured temperature.

At the time the present invention was made it would have been obvious to one of ordinary skill in the art to use a temperature sensing device or temperature sensor to operate a heating and cooling means because the use of such a device to operate the heating and cooling means would allow for more control of the deposited material temperature. As was taught by Leyden, operating a cooling (or heating) system based on the readings of a temperature sensor makes it possible to maintain the temperature of a material at a desired temperature. Thus it would be obvious to one of ordinary in the art that operating the heating and cooling means of Jang et al with a temperature sensor as taught by Leyden et al would allow for the maintaining of a desired material temperature and the invention of Jang et al would be improved by having temperature sensors.

Conclusion

Claims 197 through 208 were rejected and claims 209 through 219 were withdrawn from consideration based on a provisional oral election of a restriction requirement. No claims were allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Wiczorek whose telephone number is (571)270-5341. The examiner can normally be reached on Monday through Friday; 7:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on (571)272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/MPW/

/Michael Wieczorek/
Examiner, Art Unit 1792

/Michael Cleveland/
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